23 JUN 1942
U.S.A. 109

The
Florida Entomologist
Official Organ of the Florida Entomological Society

VOL. XXV APRIL, 1942 NO. 1

INSECTICIDAL PROBLEMS OF ENTOMOLOGICAL SERVICE *

DR. R. L. MILLER

The title assigned to your speaker, namely, "Insecticidal Problems of Entomological Service," assumes that there are problems involved in the control of insect pests; and although it would not be possible to enumerate all the difficulties that arise in any one paper, such as this, a few of the most common will be pointed out and the method of attack for their solution discussed.

The most important question involved in insecticide use is perhaps the selection of the proper material for the control of each specific pest under the set of circumstances in which it occurs. This choice of materials is usually made by research workers of the State and Federal Experiment Stations. More recently this list of materials has been added to considerably by private and industrial research, so that if one were to compare the list of chemicals suggested for insecticidal use with the list of the known elements which chemists have described, he would find that the greater portion of chemical elements in existence have been at some time or other suggested for the control of insects.

The combination of chemicals used is further complicated by the fact that insecticides are now very seldom applied singly. By which is meant that fungicide, repellant, or nutritional chemicals are more frequently used in insecticidal combinations than alone. The inter-reaction of all the chemicals, as well as the effect of each singly on insects and plants, is usually a very complicated chemical problem.

Information is beginning to accumulate regarding the physiological effect of such compounds as arsenic, copper, zinc, and manganese on citrus trees and vegetable crops. The fact that

* Delivered at annual meeting of the Fla. Ent. Soc., Dec. 5, 1941.

arsenical compounds reduce the citric acid of oranges and other citrus fruit when the trees are sprayed, and also the fact, that such metallic elements as copper, zinc, and manganese have a slight effect on delaying maturity, are very significant factors.

The more or less unpredictable physiological effect of oil sprays on citrus trees under certain conditions is very little understood. The use of sulphur compounds as well as elemental sulphur and their effect on trees and soil in which trees are growing is also a complicating factor.

More recently the use of organic compounds, namely, hormones, in the sprays on fruit and vegetable crops has been investigated and now very interesting results are beginning to develop.

In the manufacture of insecticides, it is necessary to add materials besides those directly necessary for the control of insect pests or diseases. These are added as wetters, spreaders, dispersing and emulsifying agents, and for other miscellaneous reasons. In the first place, the chemical composition of some of these compounds, both organic and inorganic, is very little understood and less is known about the effect of these products on plants or soil in which plants grow. This is one phase of insecticide investigation to which very little attention has been paid. However, the quantity of these little-discussed materials is comparatively large in some products.

When a fruit or vegetable grower reads the standard recommendations for the control of some particular pest, it all sounds very simple. The grower's next reaction is to obtain the product suggested, and apply it in the manner described. It is the business of the insecticide industry to make available these necessary products in a form acceptable for satisfactory use and some of the problems involved will be discussed below.

INSECTICIDE MANUFACTURE

Very few users of products such as Pyrethrum Powder or Rotenone appreciate the difficulty in preparing these products for satisfactory use. The grinding of fibrous materials is always difficult and particularly so in areas of high humidity. The control of the temperature during the process of grinding is most important. After the products are of the proper fineness, they must be diluted with some light, fluffy carrier, of a reaction not detrimental to the toxic ingredient of the fibrous product, either immediately or after it has been stored for long periods.

In this particular instance, the addition of a small amount of Superfine Sulphur aids greatly in improving the toxicity of these insecticides after they have been manufactured into dusting or spraying compounds.

At one time the only finely divided sulphur available was Flowers of Sulphur, made by volatilizing sulphur and collecting the small crystals. Now, since a process for grinding sulphur in the presence of carbon dioxide with reduced oxygen has been developed, the use of finely divided dusting sulphurs has practically replaced Flowers of Sulphur, and at a much lower cost of manufacture. Finely ground sulphur tends to stick together or form pellets if some material is not added which keeps the particles from doing so. These products are called conditioning agents and are also very valuable in obtaining a uniform flow of sulphur compounds from the discharges of dusters.

The manufacture of wettable sulphurs is quite similiar except that some compound which lowers the surface tension of the sulphur must be added, to enable it to make an intimate suspension with water. Both the conditioning and wetting agents must be, first of all, compatible in the mixture and produce satisfactory results on the foliage or plants treated. In many instances in wettable sulphurs an adhesive compound is also added and the handling and treatment of this compound, or the sulphur with the adhesive compound added, sometimes very materially affects the final product.

With the advent of nutritional mixtures such as copper, zinc, and manganese, and combinations of these with wettable sulphurs, a very complicated set of chemicals are involved, and considerable experience is necessary in order to prepare a final product which can be stored and used satisfactorily afterwards.

Oil sprays are by far the most complicated compounds applied to citrus trees and probably give the most erratic results when not properly manufactured or used. The selection of the oil stock to be made into an emulsion is the first and most important element involved. Considerable research on this particular point has been done, and when published reports are consulted, much controversy will be found. The purity, volatility, and viscosity of oil stocks are discussed very glibly by growers, salesmen, and manufacturers, but, after all, the only sure method for choosing an oil stock is to try it experimentally under the conditions under which it will most likely be used; and thereby determine its effect on insects and trees. The com-

plicated chemical nature of many of the organic compounds now being used in the emulsification of oil stocks can very easily add further to the unpredictable results that occur under some circumstances. This is particularly true, since it has already been pointed out that another group of organic compounds, namely, the hormones, have very interesting and sometimes beneficial and sometimes detrimental effect on trees or crops of fruit.

INSECTICIDAL USE

Although recommendations are made to growers in good faith, and are based on considerable research and experience, all of you who have had any experience at all in following up results obtained from the application of these recommendations which growers feel they have followed explicitly, know that success is not obtained in every instance.

The real insecticidal problem of entomological service, or, to put it in plain English, the insecticidal "headaches" of entomological service occur when good or satisfactory results are not obtained. The ingenuity of every one concerned is quite frequently taxed severely in an attempt to determine the reasons for failure.

The lack of understanding on the part of the user of insecticides, either of the materials used, or the action of the particular material on the insects involved, is most frequently the cause for failure.

The best illustration of this particular point is the failure to control Scale Insects by use of oil emulsions under some circumstances or by some spray crew. No matter how poor a spray job may look to an entomologist, in 99 cases out of 100, growers always believe that a good job has been done. The proper concentration of materials may be used, but in many cases too small an amount of material is applied. In other cases, although enough oil emulsion is applied per tree, it is not properly distributed over the parts of the tree most heavily infested with Scale. In still other instances the wrong type of equipment is used for its application.

The first complaint always goes to the supplier or manufacturer of the product and in practically every instance where poor results are obtained, the product is blamed.

Your speaker would like to suggest that whatever the recommedation, as much attention as possible be given to the detail of the proper use of the material. The most satisfactory

way to avoid a misunderstanding is to have a good understanding in the beginning. In the use of insecticides a good understanding is a recommendation which will give the grower or user enough information so that he can use the product he has on hand, or has obtained for the specific pest control he needs, in a way that will give satisfactory results. The amount of material, the concentration, the method of application, the time of day if that is important, the condition of the wind, the condition of the foliage, the condition of the crop as to maturity, and many other specific points should be mentioned.

Whether we realize the fact and admit it or not, the use of insecticidal chemicals alone or combined with fungicides or nutritional materials is one of the most complicated problems in agricultural production and should be handled as such. There is very little margin in many instances between the toxicity of insecticidal chemicals to insects and their toxicity to plants, but this is the margin in which all insecticides must be used. For this reason, any information or detail which can be given to users of insecticidal materials should be stated very plainly and specifically; and by so doing, growers can be helped to control pests economically instead of wasting insecticides extravagantly.

Sarcophaga bullata Parker AS A CAUSE OF INTESTINAL MYIASIS

J. R. WATSON

In January the writer received from Dr. H. D. Venters of the laboratory of the State Board of Health at Tampa three flies the larvae of which had been passed by a patient. These flies were identified by Mr. D. G. Hall, Bureau Entomology and Plant Quarantine U.S.D.A., as *Sarcophaga bullata* Parker. Mr. Hall indicated that this is the first instance that has come to his notice where *Sarcophaga bullata* has been involved in intestinal myiasis.

At the suggestion of Dr. C. F. W. Muesebeck the following clinical history was obtained from Dr. Richard Pierson of Tampa.

"Your letter to Dr. H. D. Venters in regard to larvae and flies has been handed to me. In the past six months, I have had four patients whose stools have produced these larvae.

"Patient No. 1. Woman, Age 37, Tourist Camp Operator, Complains that she is completely tired out. Is anemic. Hemoglobin 60%. Temp. 98.6, Pulse, 72, Blood Pressure 90, Appetite

poor, Bowels moderately loose. Has lost weight. Does not sleep well. Considerable gas in bowels. Suspected Hookworm. None present. Patient No. 2. Woman, age 66. Married. At Home. Has had colitis. At times constipated. Is very tired constantly. Lost about six pounds. Anemic. Hemoglobin 65%. Blood Pressure 130/85. Pulse 66. Temp. 98.6. Sleeps poorly, has no desire for food. Patient No. 3. Man. Age 43. Linotype Operator. Feels down and out. Has asthmatic attacks, shortness of breath. Cramps in bowels and a great deal of gas. He thought it might be appendicitis. Temp. 98.6, Pulse 72, Blood Pressure 100. Anemic. Patient No. 4. Man, Age 51. Tourist. Has been in Florida during the winter several years. Does not work. Has had stomach trouble for a long time. Pain in various parts of abdomen, Gas, Indigestion, Constipation. He is anemic, tired all the time, does not care to eat because of digestive distress. Temp. 98.6. Pulse 84. Blood Pressure 90.

"All of these patients improved promptly as soon as the stools were clear."

INSECT ENEMIES OF CHUFAS

In the *Entomological News* for January and also February of this year, Mr. A. F. Satterthwait of the Bureau of Entomology and Plant Quarantine, U.S.D.A., has a paper on the weevils affecting chufas, *Cyperus esculentus*, which will be of much interest to those having to do with the control of chufa insects in Florida. The work has mostly to do with the Mississippi Valley and some eastern states. One statement we would take exception to as applied to chufas in Florida. He states that these present studies indicate that the "tubers, which are the all important part of the crop, are not subject to insect attack." That certainly is not true in Florida. The most common complaint we have from farmers about chufas is that of the attack of negro bugs on the tubers.—Ed.

FOR SALE

Back Numbers of the FLORIDA ENTOMOLOGIST: Volumes I and II, $5.00 each; Volumes III to V, $2.00 each; Volumes VI to XXIII, $1.00 each; Index Volumes I to XIX, $1.00 each. Send orders to J. W. Wilson, Experiment Station, Belle Glade, Florida.

The
FLORIDA ENTOMOLOGIST
Official Organ of the Florida Entomological Society
Gainesville, Florida

VOL. XXV APRIL, 1942 NO. 1

J. R. WATSON, Gainesville.....Editor
E. W. BERGER, Gainesville.....*Associate Editor*
J. W. WILSON, Belle Glade.....*Business Manager*

Issued once every three months. Free to all members of the Society.

Subscription price to non-members is $1.00 per year in advance; 35 cents per copy.

SPIDERS OF ALACHUA COUNTY, FLORIDA

W. A. MURRILL

Spiders listed below were collected by the author in and near Gainesville between the autumn of 1935 and that of 1936. Most of the difficult species were checked by Mr. W. J. Gertsch, of the American Museum of Natural History; many by Mr. Irving Fox, of the Smithsonian Institution; and the Lycosidae by Dr. H. K. Wallace, of the University of Florida. Display sets of the larger species have been presented by the author to the Florida State Museum and the Yonge Laboratory School.

The notes on relative abundance in the county refer only to the author's experience and not to what may have been learned by others. He was in the field almost daily throughout the entire year, covering pine woods, hammocks, swamps, ponds, old fields, gardens, houses, wood-piles, logs, stumps, rock-piles, and old garbage dumps. He found spiders abundant during the first autumn, but rare during the second; a condition which he attributed to the unusually dry weather. A means abundant; C, common; F, frequent; and R, rare.

Acacesia folifera Marx. Foliated Acacesia. F
Achaea acutiventris Keys. Sharp-ended Achaea. R
Agassa cyanea (H.) Coppery-green Agassa. R
Agelena barrowsi Gertsch. Barrows' Grass Spider. F
emertoni Chamb. and Ivie. Emerton's Grass Spider. C
Aranea miniata (Walck.). Red Orb Weaver. R
pegnia (Walck.). Pegnia Orb Weaver. C
Arctosa littoralis H. Shore-loving Arctosa. R
funerea H. Somber Arctosa. R
furtiva G. & Wallace. Sly Arctosa. F
Argiope aurantia (Lucas). Orange Garden Spider. C
trifasciata Forshal. Banded Garden Spider. C
Argyrodes nephilae L. Silvery Spider. R
trigonum H. Triangular Silvery Spider. R

Ariadna bicolor (H.). Two-colored Ariadna. R
Azilia vagepicta Simon. Variegated Azilia. R
Asagena americana Emerton. Two-spotted Asagena. R
Atypus abboti (Walck.). Purse-web Spider. F
Aysha velox Becker. Swift Aysha. R
Castaneira longipalpus H. White-banded Castaneira. R
Chiracanthium inclusum (H.). Leaf-folding Spider. A
Clubiona pallens H. Spotted Clubiona. R
abboti C. Koch. Abbot's Clubiona. R
tibialis Emerton. Unspotted Clubiona. R
Coras medicinalis (H.). Medicinal Spider. C
Coriarachne versicolor Keys. Varicolored Coriarachne. R
floridana Banks. Florida Coriarachne. R
Ctenus captiosus Gertsch. Wandering Spider. F
Cyclosa caroli (H.). Slender Cyclosa. R
Dendryphantes capitatus H. Capitate Dendryphantes. F
castaneus (H.). Castaneous Dendryphantes. R
Dictyna volucripes Keys. Weed-loving Dictyna. A
Dolichognatha tuberculata (Keys.). Tuberculate Dolichognatha. R
Dolomedes albineus H. Whitish Dolomedes. F
okefinokensis Bishop. Swamp Dolomedes. R
sexpunctatus H. Six-dotted Dolomedes. F
triton Walck. Triton Dolomedes. R
scriptus H. Lettered Dolomedes. F
Drexelia directa (H.). Slender Drexelia. F
Eriophora balaustine McC. Pomegranate Eriophora. R
Eustala anastera (W.). Common Eustala. C
Filistrata hibernalis H. Hackled-web House Spider. A
Gasteracantha cancriformis (L.). Crab-shaped Spider. C
Gea heptagon H. Tuberculate Gea. R
Geolycosa fatifera (H.). Destructive Wolf Spider. F
Glyptocranium cornigerum (H.). Horned Glyptocranium. R
Gnaphosa sericata (C. Koch). Silky Gnaphosa. R
Habrocestum acerbum Peckham. Sharp Habrocestum. R
Hahnia cinerea seminola Gertsch. Gray Hahnia. R
Hentzia basilica McC. Basilica Spider. F
Herpyllus vasifer (Walck.). Vase-marked Herpyllus. R
Heteropoda venatoria (L.). Banana Spider. A
Hyctia bina (H.). Stout Hyctia. R
pikei Peckham. Slender Hyctia. R
Latrodectus mactans Fabr. Black Widow. C
Leucauge venusta (W.). Beautiful Leucauge. A
Linyphia communis H. Bowl-and-Doily Spider. C
marginata C. Koch. Filmy Dome Spider. R
Lycosa annexa Gertsch. Wolf Spider. F
carolinensis Walck. Carolina Wolf Spider. R
helluo Walck. Wolf Spider. A
hentzi Banks. Hentz' Wolf Spider. C
hocki (Keys.). Hock's Wolf Spider. R
huberti Chamb. Hubert's Wolf Spider. R
lenta H. Common Wolf Spider. A
parthenus Chamb. Virgin Wolf Spider. C
pulchra Keys. Beautiful Wolf Spider. C
punctulata H. Spotted Wolf Spider. F
rabida Walck. Savage Wolf Spider. R
riparia H. Riparian Wolf Spider. C
Lycosa wallacei Gertsch. Wallace's Wolf Spider. F
watsoni Gertsch. Watson's Wolf Spider. R
Lyssomanes viridans H. Green Jumping Spider. R
Mangora gibberosa (H.). Hunch-backed Mangora. C
placida (H.). Placid Mangora. C
Marpissa undata DeGeer. Wavy Marpissa. R
Marxia stellata (Walck.). Star-shaped Marxia. R
Metarcyba taeniola (H.). Banded Metarcyba. R
Menemerus bivittatus (Dufour). White-banded Marpissa. C
Metaphidippus capitatus H. Capitate Phidippus. C
Metazygia wittfeldae McC. Wittfeld's Metazygia. R
Mimetus notius Chamb. Whimsical Mimetus. F

Micrathena gracilis H. Graceful Micrathena. R
Misumenoides aleatorius (H.). Large Crab Spider. C
Misumenops asperatus (H.). Hairy Crab Spider. F
celer (H.). Active Crab Spider. C
oblongus Keys. Oblong Crab Spider. R
Myrmarachne albocinctus (C. Koch). White-girdled Ant-like Spider. R
Neoantistea agilis Keys. Agile Neoantistea. R
Neoscona arabesca (Walck.). Arabesque Orb Weaver. F
benjamina (W.). Benjamin's Orb Weaver. F
minima Cambr. Least Neoscona. F
Neon nellii Peck. Tiny Spotted Neon. R
Nephila clavipes L. Brush-legged Spider. R
Neriene coccinea (H.). Red Grass Spider. F
Oecobius floridanus (Banks). Florida Wall Spider. R
Pardosa floridana Banks. Florida Pardosa. C
milvina H. Common Pardosa. A
saxatilis H. Rock-loving Pardosa. F
Pellenes lepidus Gertsch. Pellenes. R
Peucetia viridans (H.). Green Lynx Spider. A
Pelopatis undulata (Keys.). Wavy Pelopatis. R
Phidippus audax (H.). Bold Phidippus. R
cardinalis (H.). Red Phidippus. F
otiosus (H.). Inactive Phidippus. F
variegatus (Lucas). Common Phidippus. C
Pholcus phalangioides (Fuessl.). Long-legged House Spider. C
Phrurolithus wallacensis Gertsch. Wallace's Phrurolithus. R
Pirata alachua G. & Wallace. Alachua Pirata. R
insularis Emerton. Island Pirata. C
minuta Emerton. Minute Pirata. R
sedentaria Montgomery. Inactive Pirata. F
Pisaurina mira (W.). Nursery Spider. R
Plexippus paykulli (Audouin). Jumping House Spider. A
Schizocosa crassipes (Walck.). Thick-footed Schizocosa. A
episinea Chamb. Schizocosa. R
incerta (Bryant). Uncertain Schizocosa. R
saltatrix (H.). Leaping Schizocosa. C
Scytodes thoracica (Latr.). Black-spotted Closet Spider. R
Sittacus floridanus Gertsch. Florida Sittacus. R
Sosippus floridanus (Simon). Florida Sosippus. A
Stoides aurata (H.). Golden Stoides. F
Tetragnatha elongata W. Large Tetragnatha. C
laboriosa H. Grass-loving Tetragnatha. F
pallescens Banks. Whitish Tetragnatha. F
pinea Seeley. Bluish-green Tetragnatha. R
seneca Seeley. Seneca Tetragnatha. F
lacerta (Walck.). Lizard-shaped Tetragnatha. F
extensa (L.). Extended Tetragnatha. F
vermiformis Emerton. Worm-shaped Tetragnatha. R
Theridion studiosum H. Social Spider. A
tepidariorum (C. Koch). Cobweb House Spider. A
Theridula quadrimaculata Banks. Four-spotted Theridula. R
Thiodina puerpera (H.). White-banded Thiodina. R
sylvana (H.). Tree-loving Thiodina. F
Tidarren fordum (Keys.). Swollen Tidarren. F
Tibellus duttonii (H.). Dutton's Tibellus. C
Trachelas laticeps Bry. Broad-headed Trachelas. C
tranquilla (H.). Tranquil Trachelas. F
Uloborus americanus Walck. American Uloborus. R
geniculatus (Oliv.). Knee-jointed Uloborus. R
Verrucosa arenata Walck. Triangle Spider. R
Wagneriana tauricornis (Cambr.). Horned Spider. R
Wala palmarum (H.). Common Wala. C
Xysticus fraternus Banks. Sociable Xysticus. R
funestus Keys. Sad Xysticus. R
Zygoballus bettini Peckham. Bronze Zygoballus. F
nervosus Peckham. Excitable Zygoballus. R
sexpunctatus (H.). Six-spotted Zygoballus. R
Zelotus subterraneus (C. Koch). Black Zelotus. F

SOME FLORIDA LEPIDOPTERA RECORDS

J. R. WATSON

(Continued from last issue)

Euptychia phocion (Fab.), the Georgia Satyr, is never seen outside of the flatwoods. The Flatwoods Satyr would be an appropriate name. It is common all summer, but disappeared in October, much earlier than *sosybia*. Grossbeck cites no records after October.

E. sosybia (Fab.), the Carolinian Satyr, is our most common butterfly in the hammocks during most of the year, including the winter. In the summer it confines its activities closely to the shade, but in the late fall and winter ventures out into the sunlight where it often rests with its wings turned perpendicular to the sun's rays. Freshly emerged individuals were observed the last of January. Its periods of especial abundance were the last of April, the first of August, and the first of November.

Minois alope (Fab.), (*Cercyonis alope* in Holland's Butterfly Book). This largest of our Satyrs has never been taken in Alachua County but is not rare in the flatwoods of the northern tier of counties of the state. The only record in Grossbeck's list is from St. Augustine, "common in summer (Johnson)".

Heliconius charithonius (L.), the Zebra, is distinctly a late summer and fall type with us, extending into December in warm autumns (1941). It is usually common in Lake County a month before it appears in Alachua County.

Dione vanillae, L., the Gulf Fritillary. This large butterfly became common by the last of May (earlier than usual). Its numbers began to decrease by mid October but lingered until the middle of December. Common in the southern part of the state in April.

Vanessa atalanta L., the Red Admiral, seems to be more in evidence during warm days in late fall and early spring. On November 21st the first seen for many weeks appeared.

Libythea bachmanni (Kirkland), the Snout Butterfly, was first observed in 1938 on March 13th, at blossoms of haws (*Crataegus*). In 1941 it was abundant in mid April to early May in situations where the hackberry grows.

Strymon wittfeldii (Ed. W.), Wittfeld's Hairstreak. Very abundant at blossoms of sebastian bush (*Sebastiana ligustrina*)

May 18-22; also taken from false Verbena, the last of June. All records in Grossbeck's list are for May.

S. melinus (Hubner), the Gray Hairstreak, was common the latter part of April and again the second week in October. All records in Grossbeck's list are from March to May and from September to November. The larva works as a budworm in loquats, a host that does not seem to be recorded in literature.

S. cecrops (Fab.), Cecrops Hairstreak, first appeared on wild plum blossoms in the middle of February. It was again common the latter part of October. Recorded in Grossbeck's list as common about Gainesville in late September. (Col. Frank E. Watson).

S. favonius (Abbot and Smith), the Southern Hairstreak, was abundant at blossoms of *Apocynum cannabinum* on May 20th. Only one seen on June 2nd. Was again common on blossoms of *Borreria* in mid October. Disappeared in late November. All records in Grossbeck's list are for April and May.

Lycaena hanno (Stoll.), the Florida Blue, was common throughout October and November and was seen in early December. All but two of the citations in Grossbeck's list are for September and November.

Urbanus proteus (L.), The Long-Tailed Skipper, abundant in the fall. During November it is our most common butterfly except locally *Euptychia sosybia.* Persisted through December. Its larva, the bean leaf-roller was abundant on legumes as late as December 15th.

Pyrgus communis (Grote) (*Hesperia montivaga* in Holland's Butterfly Book, 1st ed.), the Checkered Skipper, was common on False Verbena blossoms on July 11, 1941. Common in the fall, November and December. All records in Grossbeck's list are for September and October.

Erynnis horatius (Scudder and Burgess), Horace's Skipper. Common at blossoms of Dewberry in mid March. Scarce in November; no records for December.

Panoquina ocola (Edwards), Ocola Skipper. Abundant during October and early November. All but one (Everglade, April 5th) of the records in Grossbeck's list are for September-November.

MOTHS

Citheronia regalis Fab., The Regal Moth. The first adults of the summer brood were observed on July 6. Grossbeck lists only two localities for this common insect.

Utetheisa bella L., The Bella Moth. This moth, whose larva is a great pest of Crotalaria sp., whose pods it mines, becomes very abundant in the fall, September through November, and persists in smaller numbers all through the winter.

Alabama argillacea Hubner, Cotton-leaf-worm. The moths appeared in numbers in August and defoliation of cotton was general through the last half of August. By September 6th most of the caterpillars had pupated although some were observed a month later.

Catocala amica Hubner. This Underwing was exceedingly abundant on June 15th at "River Rise" (where the Santa Fé River again comes to the surface after flowing in an underground channel for four miles). They were found on practically every tree trunk large enough to afford shade. From many trunks more than a dozen flew. On June 28th they had completely disappeared. In Grossbeck's list there is this note concerning this species, "Lakeland, May 4, 5, 6, 7, 8, common (A. M. N. H. D. McD.)" This may represent an earlier brood.

Anticarsia gemmatilis Hubner. This adult of the Velvet-bean caterpillar was more abundant than ever before observed in mid-September. Hundreds collected around strong lights and some merchants closed their stores early on their account. The rainfall for the month was fifty per cent below normal and the fungus disease which usually sweeps them off at that season was less abundant than usual.

PRINTING

FOR ALL PURPOSES

Carefully Executed ● Delivered on Time

PEPPER PRINTING COMPANY

GAINESVILLE - - - - - - - - - - FLORIDA

THOMAS H. JONES

It was with deep regret that we learned of the passing on February 22, 1941, of one of our society's older members in the person of Thomas H. Jones at Morristown, New Jersey.

To those of us who knew him for his sterling worth and industry, his passing was a serious loss. His smiling, quiet, unassuming nature, and thoughtfulness inspired all who were acquainted with him.

Thomas Henry Jones was born at Pawtucket, Rhode Island on September 25, 1885. At an early age his parents moved to Easton, Massachusetts, where he attended the public schools and graduated from the Easton School in 1904. He then entered the Massachusetts Agricultural College at Amherst, and graduated with the class of 1908. At Massachusetts Aggie he majored in Entomology under the tutelage of the well-known teachers Professor Charles H. Fernald and Dr. Henry T. Fernald. He was elected to Phi Kappa Phi during his stay at this Institution. In 1929 he married Katherine H. Alyward of Boston.

On May 26, 1909, he was appointed to the Bureau of Entomology, United States Department of Agriculture, in the Division of Truck Crops and Stored Product Insects, which position he held until 1911 when he accepted a position with the Porto Rico Sugar Producers Experiment Station at Rio Piedras, later known as the Insular Experiment Station, of which he became entomologist. It was here that the undersigned became intimately acquainted with him and cherished his council. Owing to the "Penny wise pound foolish" attitude of the Insular Government, Tom resigned from that Institution during September, 1914, to again become affiliated with his former Division of the Bureau. During 1920 he became Entomologist of the Louisiana Experiment Station and remained there until 1924. At this place he lost his extensive library and insect collection in the fire which destroyed the experiment Station building at Baton Rouge. He felt this loss very keenly.

During 1924 he returned to the Bureau and was assigned to the Gipsy Moth Laboratory at Melrose Highlands, Massachusetts, to work on the natural enemies of the Gipsy, Brown-tail and Satin Moths. When that Laboratory was discontinued in 1935, he was transferred to the Forest Insect Laboratory at Morristown, New Jersey, to investigate insect carriers of the Dutch Elm Disease. It was while he was connected with this work that he passed away.

A bibliography of his published work is quite extensive and the contents bespeak the quality of the student and worker that he was.

He was a member of the American Association of Economic Entomologists, the Entomological Society of Washington, and the Florida Entomological Society.

To his wife, mother, and brother we offer our belated sympathies.

G. B. MERRILL

EFFECT OF COLD WEATHER UPON INSECTS IN THEIR WILD HABITATS

J. R. WATSON

We in Florida have had a very cold winter of 1940-41. Early December was warm, but on the 21st the weather turned cold and remained cold for ten weeks. During January there were only two days during which the temperature reached 70 degrees or above. The mean temperature was 11.6 degrees below normal. The cold reached its climax on the 27th, 28th, and 29th with minimum temperatures of 18, 17, and 21 respectively here at Gainesville. February was cold with a temperature of 5.4 degrees below normal, but without the severe freezes of January.

The effect of this cold upon both plant and insect life was marked. Many tender plants, of course, were killed and others so chilled as to be extremely late in developing. The effect on insect life, however, was even more marked. The only insect, however, which seems to have been directly killed by the cold, perhaps temporarily exterminated in our section, was the polka dot wasp moth, whose larva is such a severe scourge of oleanders. The adults and larvae were certainly killed and if any eggs survived they have not as yet (April 1, 1941) hatched.

Aside from these, perhaps the most marked effect has been with the skipper butterflies. Normally in February there will be a dozen species of skippers about, but this year not until the last week in February were any seen and then only one or two. Last year, for instance, there were five species of skippers to be seen during the month of January. This year not a single one. Budlea blossoms are a great favorite of this group of butterflies as they are of butterflies in general. Before the

freeze there were numerous adults of the bean leaf roller, *Eudamus proteus* (L.), but after the freeze to date not a single one has been observed.

The checkered skipper, *Hesperia montivaga* (Reakirt), is usually one of the most common skippers in the winter time. Since the freeze not a single one has been observed. Equally abundant during normal Februaries is the fiery skipper, *Hylephila phylaeus* (Drory). Up to the date this year just one has been seen, in late February. The little Florida azure is another butterfly that is commonly seen flying about in the winter, but until about two weeks ago none had been observed this year, and then only a single specimen was seen.

Other butterflies that are usually numerous in the winter time but have not been observed this winter are *Thecla favius* (Smith and Abbot); *Strymon melinus* (Hubner), the so-called hop vine butterfly, which with us in the absence of hops feeds on loquat, webbing up the leaves sometimes seriously. It will be interesting to watch for the zebra long wing, *Helioconius charitonius*. This tropical butterfly works up from the south every summer, appearing here in the late summer or early fall. In seasons following a cold winter their appearance has been very late and few have been seen. We might anticipate such a state of affairs this coming fall.

The moth *Anticarsia gemmatalis*, the adult of the velvet bean caterpillar, is another insect that works up from the south each summer, usually arriving in Gainesville in late July. We have observed in previous years that after a long cold winter they are late in appearing and the numbers are less. We expect this severe pest of velvet beans, peanuts and cowpeas to be considerably later in making its appearance this year.

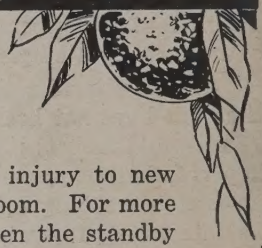
By the middle of March of last year the lubberly locust had commenced to hatch from the eggs. This year not a single one has been seen to date (April 1).

This scracity of insects is apparently due to the chilling of the pupae and the eggs with the consequent delay in their emergence. In March there have already been four days when the temperature reached 80 and the maximum temperature has been in the 70's twelve days. In normal years with such temperatures as this we would have swarms of such butterflies, so the present scarcity cannot be laid to the present temperature, so it must be the effect of chilling during January and February.

April 1, 1941.

"Black Leaf 40"

KILLS CITRUS APHIS



Protect the fruit and foliage from *Citrus Aphis*. Spray with "Black Leaf 40" while the foliage is young and the infestation is light. Prevent injury to new growth, especially while trees are in bloom. For more than 20 years "Black Leaf 40" has been the standby of particular growers.

ASK YOUR EXPERIMENT STATION

For many years leading authorities have endorsed "Black Leaf 40." It kills insects not only by contact (hitting) but also by fumes. When you mix "Black Leaf 40" with lime-sulphur, oil-emulsion, Bordeaux or calcium arsenate, or soap, you convert nicotine sulphate into volatile nicotine with powerful "gassing" properties.

Likewise, when you dust with Nicotine Dust, insects are killed by actual contact of the dust with their bodies and also by the powerful nicotine gas.

"Black Leaf 40" is a highly concentrated, uniform product. A little goes a long way —therefore economical. May be added to other standard sprays.

TOBACCO BY-PRODUCTS & CHEMICAL CORP.,

Incorporated Louisville, Kentucky

KILLS BY CONTACT AND FUMES